

1 What is claimed is:

2

3 1. A data storage device comprising:

4 an actuator for supporting and moving a head for reading and writing data with

5 respect to a recording medium;

6 a servo control unit for feeding back a position error signal obtained by scanning the

7 recording medium by the head to control an operation of the actuator;

8 a notch filter for reducing a gain of a preset center frequency component from a

9 servo signal transmitted from the servo control unit;

10 deviation detecting means for detecting deviation of a resonance frequency of the

11 actuator from a center frequency set in the notch filter; and

12 changing means for changing a set value of the center frequency set in the notch

13 filter based on a result of the deviation detection by the deviation detecting means.

14

15 2. The data storage device according to claim 1, wherein the deviation detecting

16 means comprises:

17 a band-pass filter for passing a center frequency component corresponding to the

18 resonance frequency from the servo signal transmitted from the servo control unit;

19 a phase shifter for receiving a signal containing the resonance frequency as an input,

20 and for shifting a phase at the resonance frequency of the signal by a predetermined

21 amount; and

22 a multiplier for multiplying the signal passed through the band-pass filter by the

1 signal passed through the phase shifter.

2

3 3. The data storage device according to claim 2, wherein the deviation detecting  
4 means further has an averaging unit for averaging output results of multiplication by the  
5 multiplier.

6

7 4. The data storage device according to claim 2, wherein the phase shifter comprises  
8 an all pass filter for generating a phase delay of 90 degrees as the predetermined amount.

9

10 5. The data storage device according to claim 2, wherein the changing means shifts  
11 the center frequency set in the notch filter to a low frequency side when a multiplication  
12 result by the multiplier exceeds a predetermined value, and to a high frequency side when  
13 the multiplication result by the multiplier drops below the predetermined value.

14

15 6. The data storage device according to claim 1, wherein the notch filter includes  
16 an all pass filter for passing the servo signal transmitted from the servo control unit, and  
17 a first adder for adding the signal passed through the all pass filter and the servo signal not  
18 passed through the all pass filter, and the band-pass filter includes the all pass filter, and  
19 a second adder for adding a negative value of the signal passed through the all pass filter  
20 and the servo signal not passed through the all pass filter.

21

22 7. A servo control method comprising:

1 extracting a resonance frequency of a structure contained in a servo signal;  
2 detecting deviation of the resonance frequency from a center frequency set in a  
3 notch filter; and  
4 shifting the center frequency of the notch filter to the resonance frequency side.  
5  
6 8. The servo control method according to claim 7, wherein the servo signal is passed  
7 through a band-pass filter.  
8  
9 9. The servo control method according to claim 7, wherein a signal of the extracted  
10 resonance frequency is multiplied by a delay signal delaying the phase of the servo signal  
11 by 90 degrees, and the center frequency set in the notch filter is shifted to a low frequency  
12 side when an the deviation of the resonance frequency exceeds a predetermined value, and  
13 to a high frequency side when the deviation of the resonance frequency drops below the  
14 predetermined value.  
15  
16 10. The servo control method according to claim 9, wherein after the multiplication  
17 of the signal of the extracted resonance frequency by the delay signal delaying the phase of  
18 the servo signal by 90 degrees, output results of multiplication are averaged.  
19  
20 11. A computer program comprising:  
21 a means of extracting a resonance frequency of a structure contained in a servo  
22 signal;

1           a means of detecting deviation of the resonance frequency from a center frequency  
2 set in a notch filter; and  
3           a means of shifting the center frequency of the notch filter to the resonance  
4 frequency side.

5

6           12. The computer program according to claim 11, wherein the means of extracting  
7 the resonance frequency of the structure contained in the servo signal passes the servo  
8 signal through a band-pass filter.

9

10          13. The computer program according to claim 11, wherein the means of detecting  
11 the deviation of the resonance frequency from the center frequency set in the notch filter  
12 multiplies a signal of the extracted resonance frequency by a delay signal delaying a phase  
13 of the servo signal by 90 degrees, and the means of shifting the center frequency of the  
14 notch filter to the resonance frequency side shifts the center frequency set in the notch filter  
15 to a low frequency side when an output of the means of detecting deviation exceeds a  
16 predetermined value, and to a high frequency side when the output drops below the  
17 predetermined value.

18

19          14. The computer program according to claim 13, wherein the means of detecting  
20 the deviation of the resonance frequency from the center frequency set in the notch filter  
21 averages output results of multiplication after the multiplication of the signal of the  
22 extracted resonance frequency by the delay signal delaying the phase of the servo signal by

1 90 degrees.